REMARKS

SPECIFICATION AND ABSTRACT

The specification has been amended to correct certain inadvertent typographical errors and/or to otherwise improve its form.

No new matter has been added by the amendments to the specification.

The original abstract has been canceled and a new abstract is being substituted therefore which it is believed conforms with the requirements for proper abstract.

CLAIM OBJECTIONS AND CLAIM REJECTIONS UNDER 35 U.S.C. § 112

Claims 1-7 were objected to and/or rejected under 35 U.S.C. § 112 for the various reasons set forth on pages 2-4 of the Action. By this Amendment, original claims 1-7 have been canceled and new claims 8-11 have been added. It is submitted that new claims 8-11 satisfy all the requirements of 35 U.S.C. § 112.

CLAIM REJECTIONS UNDER 35 U.S.C. § 101

Claims 2-7 were rejected under 35 U.S.C. § 101 for the reasons set forth on pages 5-7 of the Action. Claims 1-7 have been canceled and new claims 8-11 have been added. New claims

8-11 are believed to satisfy all the requirements of 35 U.S.C. § 101.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schellenberger et al U.S. Patent No. 6,027,873 for the reasons set forth on pages 7 and 8 of the Action.

Claims 3 and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schellenberger et al and Hunter U.S. Patent No. 6,387,331 for the reasons set forth on pages 8 and 9 of the Action.

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Gratzl et al U.S. Patent No. 6,043,878 for the reasons set forth on pages 9 and 10 of the Action

For the reasons set forth hereafter, it is submitted the new claims 8-11 patentably distinguish over the prior art.

PATENTABILITY OF THE CLAIMS

Applicants' invention as now claimed is directed to an apparatus for measuring fluorescence or phosphorescence which includes a sample holder, an excitation light beam generator to irradiate the sample with an excitation light beam and a

photometer for detecting fluorescence or phosphorescence from the irradiated sample.

The sample holder is a plate having a through-hole therein with an excitation light generator side opening portion of the through-hole being equal to or larger in area than a photometer side opening portion of the through-hole, and the areas of the excitation light generator side opening portion and the photometer side opening portion being equal to or larger than a cross-sectional area of the excitation light beam in the vicinity of the sample. As discussed hereafter the invention as now claimed is patentable over the prior art.

The Schellenberger et al '873 patent teaches a testing plate provided with a great number of through-holes, which may each have a conical shape, holding solution through surface tension.

In Schellenberger et al, as is apparent from Fig. 4 thereof, light from a light source is used so as to irradiate all the through-holes of the testing plate. Therefore, if the testing plate is used for measuring fluorescence or phosphorescence emitted from a sample solution by irradiating the sample solution with the light from the light source, background noise light scattered from elements other than the sample solution, typically that from the testing plate, causes

the lower limit of detection or measurement to be deteriorated. This means that Schellenberger et al does not assume, or is not aware of, measurement of fluorescence or phosphorescence.

An object of the present invention is to provide an apparatus for measuring fluorescence or phosphorescence which allows noise light generated from other than the sample to be reduced, and in order to attain the object, a feature of the present invention exists in the fact that the areas of the excitation light generator side opening portion and the photometer side opening portion are equal to or larger than a cross-sectional area of the excitation light beam in the vicinity of the sample, which feature is distinct from Schellenberger et al. The present invention makes it possible to hold a larger quantity of a sample by forming the sample holder in a plate shape and making the areas of the excitation light generator side opening portion and the photometer side opening portion equal to or larger than a cross-sectional area of the excitation light beam in the vicinity of the sample.

In Schellenberger et al, it is considered that the purpose of providing the sample holder with a lot of through-holes is to ensure high measurement sensitivity. In such a

case, therefore, it is not necessary to let each through-hole hold the solution in great quantities.

In addition, Schellenberger et al fails to teach or suggest which of the light source side opening portion of each through-hole and the photometer side opening portion thereof is larger in area. Moreover, Schellenberger et al does not teach that background noise light generated during measurement is to be removed. Thus, Schellenberger does not take countermeasures to prevent the testing plate from being irradiated with light because it is sufficient if only a large number of through-holes are provided and they pass light, as is apparent from Fig. 4.

If the excitation light irradiates the sample holder in addition to the sample accommodated therein, scattered noise light characteristic of the material of which the sample holder is made is emitted from the sample holder. In the present invention, as stated above, because only the sample is irradiated with the excitation light, the measurement is performed without being affected by the scattered noise light characteristic of the material of which the sample holder is made, and thus a signal-to noise ratio (S/N ratio) is greatly improved.

A significant point of the present invention is to increase a signal by enlarging the light source side opening portion of the through-hole and to decrease a noise by preventing irradiation of the photometer side opening portion of the through-hole with the excitation light from the light source.

As mentioned above, the present invention is different in its object and constitution from Schellenberger et al, though the technical field of the present invention is similar to that of Schellenberger et al. Therefore, the present invention is not believed to be obvious in view of Schellenberger et al and the other prior art.

The advantageous effects of the present invention are set forth in the attached declaration of one of the inventors, Michihiro Saito. The declaration is based on a test in which Mr. Saito participated using the present invention. As set forth in the declaration, Fig. 1 in the drawing attached thereto, is a schematic sectional view of a sample holder according to the present invention comprising a slide glass plate made of polystyrene on which a mask made of carbon is placed and Fig. 2 is a perspective view of the carbon-made mask. The polystyrene-made slide glass plate is 1 mm in thickness and has a through-hole of 1.2 mm in diameter. The

carbon-made mask is cylindrical and has a length of 4 mm, an outside diameter of 6 mm and an inside diameter of 4 mm. The carbon-made mask has a bottom plate of 1 mm in thickness which has a light beam passing hole aligned with the through-hole. An irradiation light beam is passed through the light beam passing hole of the carbon-made mask and then the through-hole of the polystyrene-made sample holder.

Fig. 3 in the drawing is a graph showing intensities of background noise signal actually measured with the diameter of the diameter of the through-hole set to 0.53 mm, 0.77 mm, 1.05 mm and 1.5 mm. The measurement was performed by using a nitrogen gas laser in order to generate the irradiation light beam and using a time-resolved photometer in order to detect the irradiation light beam which is passed through the light beam passing hole and the through-hole. In Fig. 3, the background noise signals are based on light scattered from the sample holder and therefore they are peculiar to or characteristic of the polystyrene material of which the sample holder is made.

It is apparent from Fig. 3 that the intensity of the background noise signals is remarkably decreased as the diameter of the through-hole becomes small. In view of this

fact, it would be understood that the advantageous effects of the present claimed invention are remarkable.

In view of the foregoing amendments and remarks, Applicants contend that this application is in condition for allowance. Accordingly, reconsideration and reexamination are respectfully requested.

Respectfully submitted,

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